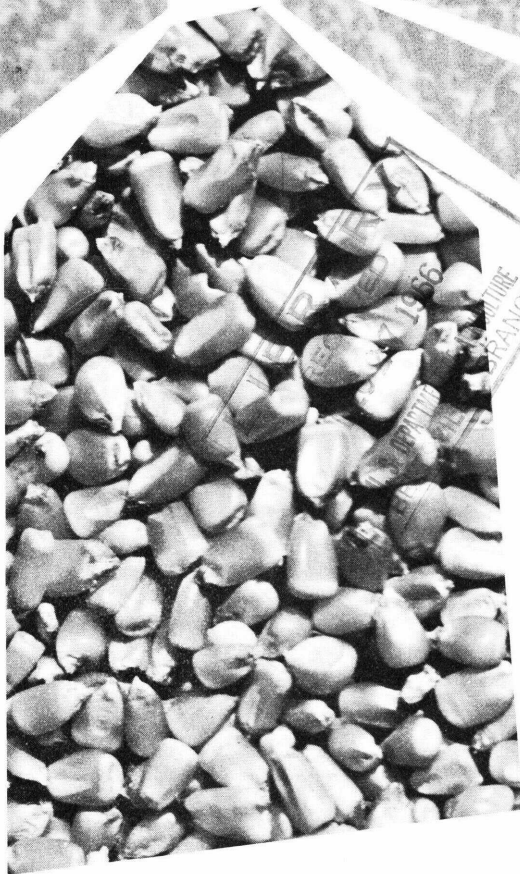


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GROWING CORN



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This bulletin supersedes Farmers' Bulletin 2073, "Corn Production." The photograph on page 9 is through the courtesy of Deere & Co. That on page 7 is through the courtesy of Allis-Chalmers Mfg. Co. The photograph on page 3 is through the courtesy of International Harvester Co.



A more comprehensive discussion of this subject appears in Agriculture Handbook 322, "Corn Production," available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, at 20 cents per copy.

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GROWING CORN

Growing corn has been affected by many changes since World War II. Hybrid varieties are continuing to replace open-pollinated varieties in areas where adapted hybrids were not available. New, higher yielding hybrids are replacing older hybrids.

More fertilizer is used, and more effective use is increasing the yield of corn per acre.

With more machinery in the field, the corn grower is better able to time his work to fit the needs of the corn plant. Improved pickers and driers have further mechanized growing corn.

SELECTING SEED

How can you be sure that the seed corn you buy is best for your farm? You can look at it. But you won't find out very much. You can tell if the seeds are all the same size, if they have been treated, and if they are cracked or broken. But you need to know more.

Seed that does well in the Corn Belt may mature too late for growing farther north. It may not be able to withstand insects and diseases in Alabama or dry weather in Arizona.

Ask your county agricultural agent for information. He can tell

you what corn hybrids have tested out best in your State. He probably will know what has given high yields in your area.

Seed dealers usually know about the performance of the seed they sell.

PREPARING THE SOIL

Fertilizing

You can find out how much and what kind of fertilizer to use by having your soil tested. Your county agricultural agent can tell you where to have this done and how to take the sample. He also can tell you when and how to apply fertilizer to get best results.

For corn, you can apply fertilizer in any one of three ways—(1) near the row at planting time, (2) broadcast and plowed under or disked in before planting, and (3) in a band either before or after the plant emerges.

Corn uses more nitrogen than any other nutrient. It most needs nitrogen during the 2-week period before tasseling and the 3-week period after tasseling. Corn plants that are not getting enough nitrogen have light yellowish-green leaves and are spindly and stunted. Leaves will die and turn brown.

Tilling

You can prepare a field for corn by conventional tilling or by minimum tilling.

If you look to yields alone, it is difficult to choose between the two types of tilling. Usually the results are about the same if stands are about the same. But the type of tilling can affect yield in certain circumstances. Where rainfall is low, yields may be better with minimum tilling because less water is lost through runoff. Likewise, on soils that pack during tilling or rainstorms, yields may be greater with minimum than with conventional tilling. However, because minimum tilling often makes the seed row more cloddy, stands and yields may be lower than with conventional tilling.

Conventional Tilling

If you use conventional tilling, disk the field, plow it early, work it with a disk harrow once or twice, and finally harrow it with a spike-tooth or drag harrow. Most farmers use a runner or single-disk opener planter for corn under conventional tilling.

Conventional tilling usually gives a firm, finely pulverized seedbed. This produces good corn stands and high yields. Clods and trash do not interfere with rapid cultivating.

However, conventional tilling has some disadvantages. It is more expensive than minimum tilling. The many trips over the field produce very firm and often packed seedbeds. As a result, the soil surface seals rapidly, rain doesn't soak in quickly, and runoff and erosion increase.

Minimum Tilling

With minimum tilling, you make fewer trips over the field than with conventional tilling. You can use wheel-track, plow-plant, or strip-processing practices.

For wheel-track planting, plow separately from planting, and plant in the firmed soil of a wheel track. You can make the wheel tracks with the tractor or with another wheel added for the purpose. A spike-tooth harrow section, rotary hoe section, plow packer, or similar device pulled behind the plow will break up the large clods and help smooth the soil. The wheel further breaks up and packs the soil.

In plow planting, attach a planter to the side of the plow or tractor, so that it plants on the turned furrows at the same time that you plow the field.

In strip processing, plow the field and then till a band of soil to break up large clods and to firm the soil in the seed row. You may do this by attaching a few wheels or a rotary hoe section immediately ahead of the planter.

Many variations and combinations are possible. On fall-plowed land, you can mount a cultivator on the front of a tractor planter. This eliminates the need for disking and harrowing before planting.

Minimum tilling has some advantages. Weeds are slow to start in the loose soil between the rows. Some of the disking, harrowing, and cultivating operations are eliminated and costs are cut as much as \$5 per acre. Overworked soil and soil compaction are minimized.

Erosion losses can be reduced 40 percent with wheel-track or plow planting as compared with conventional tilling.

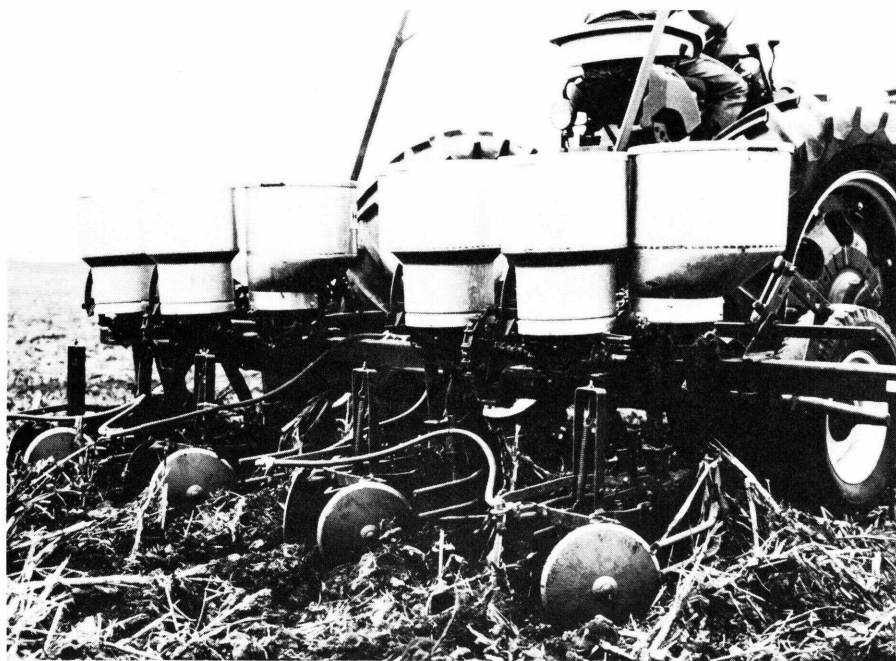
Minimum tilling works best with medium- and coarse-textured soils, in which clods are easily broken. Minimum tilling includes mulch tilling and listing.

Mulch Tilling.—Mulch tilling leaves all plant residues on or near the soil surface. Prepare the land for planting with underground sweeps, chisels, or rotary-type implements, which loosen the soil to a depth of 7 or 8 inches. Disk or chop the previous year's cornstalks before loosening the soil.

Mulch tilling works best in the western Corn Belt and Northern Plains areas on medium- and coarse-textured soils that are well drained. Corn yields from mulch-

tilled fields in these areas may be as good as or better than those from conventionally tilled fields, but yields usually are slightly poorer in more humid areas. The surface mulch keeps the soil cooler in early spring. This slows down early growth. Nitrogen and potassium availability in the soil may be lower, and you may have to apply larger amounts of fertilizer. You may have trouble getting good stands with mulch tilling.

Listing.—Lister planters place corn in furrows 4 to 7 inches deep. The planters are built with two or four plows having landsides welded together. In listing, you use special disk cultivators to throw the soil out of the furrow during early cultivation and, during final cultivation, to level ridges and move the soil into the furrows. You can work



Corn lister with reduced tillage equipment.

BN-27579

down ridges first with a rotary hoe or spike-toothed harrow and then cultivate with a shovel-type cultivator.

Listing has not been successful in parts of the Corn Belt having 30 inches or more of annual rainfall. Seed germination and seedling growth are slow in the cold soil of the furrow bottoms. Row fertilizer may help corn to get a better start. In drier areas, yields from listed fields have often been greater than from those planted in other ways.

On hill ground, where the lister is used on the contour, furrows trap and hold rainwater until it can soak into the ground. Water is saved for dry summer periods and erosion is reduced.

Listing in ground that has not been plowed is called hard-ground listing. One advantage of hard-ground listing is that it is a once-over operation. It prepares the seedbed and plants the corn at the same time. Farmers near the Missouri River and other bottomlands in the western part of the Corn Belt like this method. They can plant the crop quickly and thus take advantage of the limited periods when they can till satisfactorily.

Hard-ground listing does not completely kill heavy legume-grass sods and, for this reason, is not suitable.

PLANTING

Time

Most farmers plant corn 10 days to 2 weeks after the last killing frost. Corn planted earlier comes up slowly and may be damaged by frost. If it is planted later in the

North, the growing season will not be long enough. In the South, a small delay in planting usually is not serious. Your State experiment station or county agricultural agent can tell you the best dates for planting in your area.

Rate

No planting rate for corn is best everywhere. In any area, the best planting rate is the one that produces the most corn per acre. The best rate is a balance between the number of plants and the yield per plant. As the number of plants increases, the yield per plant decreases. How large the yield is at this balance point depends on the type of soil you have, how fertile it is, how much water the corn gets, what the weather is like, and the kind of hybrid you choose. The best stand for you probably will be somewhere between 6,000 and 25,000 plants per acre. The amount of water that is available to the corn crop probably will be most important in deciding what your stand will be.

Plant a larger number of seeds of early hybrids than of full-season hybrids. Plant more seeds for silage than for grain. You can estimate field stands by using the table on page 5. The distances given are for final stands.

The final stand is influenced by seed quality and weather and is always less than the germination percentage of the seed planted. For this reason, you must plant 5 to 10 percent more seeds than the number of final plants you want. Final stand is hard to predict because of

HOW TO ESTIMATE A STAND OF CORN

If the average distance ¹ between plants is—					Then the number of plants per acre will be—
30-inch row	36-inch row	38-inch row	40-inch row	42-inch row	
<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	
34¾	29	27½	26¾	25	6,000
26	21¾	20½	19½	18¾	8,000
21	18	16½	15¾	15	10,000
17½	14½	13¾	13	12½	12,000
15	12½	11¾	11¼	10¾	14,000
13	11	10¼	9¾	9¼	16,000
11½	9¾	9¼	8¾	8¼	18,000
10½	8¾	8¼	7¾	7½	20,000
9½	8	7½	7	6¾	22,000
8¾	7¼	6¾	6½	6¼	24,000

¹ To the nearest ¼ inch.

differences in seed quality and weather.

After the corn is harvested, you can tell if you planted the right number of seeds per acre. If an average sample of air-dried ears weighs more than one-half pound for each ear, your final stand was too thin.

CONTROLLING WEEDS

Cultivating

The main purpose of cultivating is to kill weeds. Weeds are easiest to kill by cultivating when they are small—if possible even before you can see them above ground. The cheapest and best cultivators are the rotary hoe, the spike-tooth harrow, and the spring-tooth weeder. Of these, the rotary hoe is most popular.

These cultivators work best when the ground is slightly crusted and when most of the weeds have not yet come up or are not more than one-fourth inch above ground.

Shallow cultivating tools, such as the rotary hoe, kill the weeds without hurting the crop. Until the corn plants are 6 to 8 inches tall, you can safely cultivate with a rotary hoe. After that, the hoe will damage the corn.

Surface cultivators do not kill perennial weeds or established annual weed seedlings.

The shovel cultivator is best for cultivating soils after you use the rotary hoe. It also works well for the first cultivation. The “duck-foot” sweep, which runs nearly flat



BN-27577

Rotary hoe wheels on this two-row cultivator protect corn plants from being buried during early cultivating.

under the soil surface, is the most generally useful type of shovel. Cultivate just deep enough to kill weeds. As the corn grows, place the shovels farther from the plants. Cultivating deep or too near the row often cuts the corn roots.

You can use disk cultivators or cultivators with larger than normal "duck-foot" sweeps if you prepared the seedbed with mulch-tilling or if the field is covered with heavy crop residues or vine weeds.

Corn usually does not need cultivating after it is 24 to 30 inches tall if weeds have been controlled by earlier cultivating.

Cultivate even though there are few weeds if rain has left a crust on the soil.

Using Herbicides

You can apply herbicide sprays before or after the corn comes up and during the lay-by period. These are known as preemergence, postemergence, and directed-postemergence sprays.

Combinations of preemergence and postemergence sprays will control weeds over a long period. Preemergence sprays, which are applied at heavier rates than the others, control annual grasses and broadleaf weeds for 5 to 7 weeks. Postemergence sprays control broadleaf weeds that germinate after the effects of the first spray are gone.

Apply preemergence sprays at any time between planting and appearance of the first leaves.

Preemergence sprays work well in most areas and on most soil types. They are especially useful

PRECAUTIONS

Some herbicides can be hazardous to man and animals. Use herbicides only when needed and handle them with care. Follow the directions and heed all precautions on the labels.

Keep herbicides in closed, well-labeled containers in a dry place. Store them where they will not contaminate food or feed, and where children and pets cannot reach them.

Avoid spilling herbicide on your skin, and keep it out of your eyes, nose, and mouth. If you spill any on your skin, wash it off with soap and water.

Do not inhale herbicide dusts or mists.

Do not contaminate lakes, streams, or ponds with herbicide. Do not clean spraying equipment or dump excess spray material near such water.

Avoid drift of herbicide to nearby crops.

Dispose of empty herbicide containers at a sanitary land-fill dump, or bury them at least 18 inches deep in a level, isolated place where they will not contaminate water supplies.

on wet soils that have heavy weed infestations. Do not use preemergence sprays of 2,4-D on sandy loams or coarse soils—the herbicide may penetrate too deeply and injure germinating corn. More herbicide is needed on soils high in clay or organic matter than on sandy soils low in organic matter. The combination of hot weather and high soil moisture that makes



BN-27575

Preemergence spraying of herbicides to planted corn using attachments to corn planter can be a part of planting operation, as shown here, or as a separate operation.

corn grow best also makes pre-emergence sprays work best.

If you spray after the corn comes up, wait until it is 6 to 10 inches tall. Spray the tops of the weeds for best results. As corn grows taller, you are more likely to injure it with overall sprays. You may expect brittleness and some bending after spraying corn that is several inches tall. For this reason, wait 5 to 10 days after spraying before cultivating.

Previously weed-free corn may become heavily infested with weeds as the crop approaches the lay-by time. Cultivating may not kill weeds, especially during rainy periods. At this time, use directed spraying with drop nozzles. Arrange the nozzles so that they spray the base of the cornstalks and weeds in the row as well as between rows.

Spray as soon as possible after the last cultivation.

HARVESTING THE CROP

Corn is harvested for grain, silage, or fodder; occasionally it is cut up and fed green.

Silage

Silage makes the most efficient use of the corn crop. An acre of corn as silage has about one-third more feeding value for beef cattle than an acre harvested for grain.

Most farmers harvest for silage when the grain is in the hard dough stage.

Hogging Down

Hogs harvest corn fairly well if the ground is reasonably dry and if they are kept in small areas that they clean up thoroughly before being moved to a new area.

Lambs harvest corn somewhat less efficiently than hogs, and cattle less efficiently than lambs. Hogs following lambs or cattle improve the efficiency of harvest. If the soil is wet, it may be packed by trampling.

Grain

The sooner corn is picked after it is ripe, the lower is the harvest-loss. However, corn picked too early is too damp for safe storage without drying.

One man usually takes about a day to husk an acre from standing stalks by hand and longer to husk it from the shock. A man with a two-row picker can gather the ears from an acre of corn and deliver them to a wagon in 40 to 45 minutes.

The most common cornpickers are the one-row type, either tractor drawn or semimounted, and the two-row type, either tractor mounted or self-propelled. The picker husker snaps the corn from the standing stalks, removes most of the husks, and delivers the ears into a wagon or a truck. Some machines snap off the ears but do not husk them.

A two-plow tractor is large enough with a one-row picker or even a lightweight two-row picker where the ground is level and dry and the crop is light. You will need a three-plow or larger tractor for a heavy crop. A tractor-drawn picker generally will fit any tractor with standard power takeoff, but you must select a tractor-mounted type that fits your particular make and model of tractor.

Many farmers use the picker sheller. It picks, husks, shells, and delivers the corn into hoppers or trailing wagons all in one operation. These machines are expensive and the corn as harvested usually must be dried.

You can use high-moisture shelled corn as silage. The advantages include earlier harvest and therefore lower harvest losses, lower storage costs, and simplified mechanical feeding. For best results, harvest when the grain contains about 30 percent of moisture. Tightly seal the silo to prevent excessive spoilage. Remove enough feed each day to keep down top spoilage.

Loss by shelling is less than 2 percent when you use a picker and the grain contains 22 percent or more of moisture. Loss is 5 to 6 percent when the grain contains 15 to 17 percent of moisture. Loss is 9 to 13 percent when the crop remains in the field until moisture is down to 14 to 15 percent. Most of the loss from shelling is at the snapping rolls.

In a test, losses in dropped corn for 24 mechanical cornpickers ranged from 5½ to 25 bushels per acre in corn averaging 80 bushels per acre. Efficient operation of a picker is important in reducing costs and increasing yields.

CROPPING PRACTICES

You can grow corn year after year on the same land or you can rotate it with other crops. The choice depends on the condition of your soil and what you do to keep it in condition.



Two-row picker husker in operation.

BN-27578

If you have different kinds of soil on your farm, you will want to use each acre for the crop that does best on it. You may want to grow corn nearly continuously on level or slightly rolling, permeable soils. On slow-draining soils and soils that are moderately eroded, corn grows best in rotation with sod crops. On steep soils, where erosion is a problem, you will want to grow a low forage crop. You can use slow-draining areas continuously for crops that do not require early spring field operations, and you can use droughty soils for drought-resistant or drought-evasive crops, such as sorghums or winter small grains.

When you decide on the way to crop corn for a particular soil, consider erosion, fertility, structure, organic matter, and drainage of the

soil in addition to the needs for weed, insect, and disease control.

Although corn grown for several years in succession uses large amounts of nitrogen, the long-term

CAUTION: Always stop the picker when you clean the snapping or husking rolls or make any other adjustments. The cornpicker is one of the most dangerous farm machines. It is involved in many accidents that cause the loss of hands, arms, and even lives. Such accidents are needless. Reverse gear attachments, which fit many types of cornpickers, enable you to clean snapping rolls and gathering chains by reversing their action from the driver's seat. The increased safety given by reverse gears makes them well worth buying and using.

needs for phosphorous and potassium may be less than for a rotation with legumes with which no added nitrogen is necessary. You may find it easier to keep the soil fertile for corn grown several years in succession than for all the crops in a rotation.

Since soil erosion is higher from cornland than from close-growing meadows, usually you must grow corn in rotation with meadows on sloping land. Most farmers prefer grasses or grass-legume mixtures over legumes grown alone for water-erosion control.

Yields from corn grown continuously under a high level of management have been nearly equal to those from corn grown in rotation on deep, medium-textured soils of the Corn Belt. On other soils, yields from corn grown continuously have been less than those in rotation, but the differences are usually much less than were once expected.

If not well managed, soils on which corn is grown continuously or in rotation with a high percentage of corn may crust over. Crusted soil takes in less water and fewer seedlings come up. It becomes too cloddy and is difficult to till.

Good management includes using enough fertilizer, returning crop residues to the soil, and avoiding too much tilling.

For many years, crop rotation was recommended to control weeds. Now, chemicals and cultural practices can usually control weeds, insects, and diseases in corn grown either continuously or in rotation.

Nitrogen fertilizer often can be purchased more cheaply than it can

INSECTS AND DISEASES

Many diseases and many kinds of insects damage corn. A corn plant has a chance of escaping with less injury if adapted to its environment and well fertilized. For information on controlling diseases and insects that affect corn in your area, see your county agricultural agent.

be obtained from green-manure crops. Furthermore, problems with diseases, insects, nematodes, and moisture may be greater if you rotate with a green-manure crop.

If your farm is in the Corn Belt or the Northeastern States, you may want to rotate corn with oats and meadow or oats-meadow-meadow, corn-corn-oats-meadow, corn-oats-green manure, corn-soybeans, corn-soybeans-wheat-meadow, or corn-soybeans-corn-oats-meadow.

The number of years of corn and meadow you should use in the rotation will depend on your soil management problems. If erosion is likely to be severe, use several years of sod crops (preferably grass or grass-legume mixtures) with 1 or 2 years of corn per rotation. Supplement with other erosion-control practices, such as terracing, contouring, and tilling.

If you want to use rotations for making nitrogen available to the corn, use rotations with short periods of legumes and corn—for example, corn-small grain-legume meadow or corn-corn-small grain-legume meadow. You also may use legume green-manure crops as a source of nitrogen.